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Heavy Metals in Packagings - Check Analyses 1998

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The reports are, however, published because the Danish EPA finds that the studies represent a valuable contribution to the debate on environmental policy in Denmark.

Contents

1 Introduction

In 1997 the Danish Environmental Protection Agency published the report entitled: Survey of the Content of Heavy Metal in Packagings on the Danish Market, Environmental Project No. 349.

At the end of 1998 - to follow up on this project - the Danish Environmental Protection Agency has requested an analysis of a number of bottle and metal packagings for the content of the heavy metals chromium, lead, cadmium and mercury.

2 Procedure

2.1 Purchase

The packagings were purchased in the western part of Copenhagen on 23 November 1998 by Birgitte Kjær, the Danish Environmental Protection Agency, and Ivan Christensen, Danish Technological Institute, Aarhus.

Project 349 from 1997 revealed a high content of lead in soldered tins.

Therefore, an attempt was made to buy soldered tins.

However, it proved difficult to find tin packagings with soldered joints. In-

quiries at building markets (Bauhaus and Silvan), dealers in car cleaning agents, paint dealers and various hobby shops all proved negative. An explanation was also given. "It is too expensive to make anything else but tins with rolled joints".

As to this type of tins, project 349 did not show high content of heavy metals.

The purchase of tin packagings ended up with one tin of alkyd lacquer which, from a visual point of view, could be soldered, as well as two tubes of hobby colours.

Project 349 showed wine bottles with a high content of lead. To assess the lead content of the wine bottles on the market in 1998, 47 packagings in the form of wine bottles at a price of DKK 25-60 were purchased.

Two wines were bottled in Denmark whereas the rest of the wines were imported on bottles. Wine bottles imported from Argentina, Australia, Bulgaria, California, Chile, France, Greece, Italy, Portugal, Spain, South Africa, Germany and Hungary were purchased.

Rumania was not represented, but two bottles from this country were ac-

quired later.

Place of purchase, country of origin and mark of the 52 samples appear from enclosures I and II.

2.2 Analyses

The analyses for the content of the heavy metals chromium, lead, cadmium and mercury were carried out as described in project 349. The wine bottles were crushed. After crushing of the glass, a pellet was pressed of the glass powder and analysed by X-ray technique (Philips PW2400/UNIQUANT, ver. 4.14).

After the tin had been cut up, it was analysed at the joint. The X-ray analysis showed a high content of lead, and therefore, an atomic absorption spectrometry analysis was also performed after solution in a hydrochloric acid/nitric acid mixture. The result was converted to a content based on the entire tin packaging.

The tubes were cut up and analysed directly by X-ray technique (the main component was aluminium).

3 Results

Sample No.	Type of Sample	ppm Cr	ppm Cd	ppm Hg	ppm Pb
1	V	1820	<10	<10	150
2	V	1500	<10	<10	41
3	V	970	<10	<10	29
4	V	990	<10	<10	50
5	V	1500	<10	<10	45
6	V	1200	<10	<10	460
7	V	340	<10	<10	110
8	V	590	<10	<10	160
9	V	60	<10	<10	160
10	V	1700	<10	<10	260
11	V	1700	<10	<10	220
12	V	1300	<10	<10	100
13	V	1300	<10	<10	120
14	V	1600	<10	<10	160
15	V	1600	<10	<10	110
16	V	1400	<10	<10	100
17	V	1600	<10	<10	71
18	V	1900	<10	<10	150
19	V	1800	<10	<10	110
20	V	390	<10	<10	130
21	V	1300	<10	<10	370
22	V	1300	<10	<10	300
23	V	1300	<10	<10	300
24	V	2200	<10	<10	200
25	V	1300	<10	<10	26
26	V	1700	<10	<10	210
27	V	1200	<10	<10	78
28	V	1400	<10	<10	220
29	V	1300	<10	<10	140
30	V	74	<10	<10	64
31	V	1700	<10	<10	150
32	V	1200	<10	<10	350
33	V	1650	<10	<10	150
34	V	1700	<10	<10	200
35	V	29	<10	<10	420
36	V	600	<10	<10	170
37	V	1400	<10	<10	170
38	V	1200	<10	<10	2400
39	V	570	<10	<10	170
40	V	600	<10	<10	160
41	V	1100	<10	<10	37
42	V	1300	<10	<10	26
43	V	2100	<10	<10	180
44	V	1600	<10	<10	29
45	V	1200	<10	<10	29
46	V	300	<10	<10	110
47	V	1300	<10	<10	200
48	D	<1 *	<10	<10	150 *
49	T	<10	<10	<10	50
50	T	<10	<10	<10	36
51	V	1300	<10	<10	73
52	V	1600	<10	<10	37

The results marked with *) have been found by atomic absorption spectrometry.
The other results are average values of double determinations by X-ray technique. Accuracy: ± 1% rel.

Types of Samples

V Wine bottles
D Tin
T Tube

4 Conclusion

To follow up on project 349 of the Danish Environmental Protection Agency: Survey of the Content of Heavy Metal in Packagings on the Danish Market 3 metal and 49 glass packagings have been analysed.

In the Packaging Directive (94/62) threshold limit values for the sum of the concentration levels of lead, cadmium, mercury and hexavalent chromium have been laid down.

During the period from 30 June 1998 to 30 June 1999, the sum of the concentrations of the 4 heavy metals must not exceed 600 ppm.

During the period from 30 June 1999 to 30 June 2001, the threshold limit value is 250 ppm.

The threshold limit value of 600 ppm is exceeded in one case.

The coming threshold limit value of 250 ppm is exceeded in eight cases.

The exceeding of the threshold limit values, which - in all cases - has been found in the glass packagings, has merely been assessed on the basis of the lead content. The values found for chromium is the total content of which the share of Cr(VI) is low.

Enclosure I

A Registration of Samples of Wine Bottles

Sample No.	Origin	Mark	Type of Wine	Place of purchase
1	Chile	Sunrise, 97	Red	O
2	Australia	Hardy, Stamp 97	Red	O
3	South Africa	Sable View, 95	Red	O
4	California	Carignare, Inglenook	Red	O
5	France *	Bourgogne, 96	White	O
6	Argentina	Santa Ana, 96	Red	O
7	Germany	Flonheimer Kabinett, 97	White	O
8	France	Chasse du Pape, Rhone, 97	Red	O
9	Italy	Castelli Romani, Tullio	White	O
10	Portugal	Mateus, White	White	O
11	Portugal	Porta Nova, Vino Verde	White	O
12	Spain	Solmayor, Mancha	White	O
13	Spain	Priorat, 94	Red	O
14	Portugal	Chancellor	White Port	O
15	France	Parentiere, Loire, 96	Muscadet	O
16	Spain	Misela, Rioja, 93	White	O
17	Italy	Marsala, Sicilla	Dessert Wine	O

18	Italy	Martini, Extra Dry	Vermouth	O
19	France	Ch. Carmeilh, Bordeaux, 96	Red	O
20	France	Ch. St. Didier-Parnac, Cahor, 95	Red	O
21	Italy	Bardolino, 95	Red	O
22	Italy	Sangiovese, Toscana, 97	Red	O
23	Italy	Salice, Pugnia, 96	Red	O
24	France	Riesling, Witz, 97	White	O
25	Bulgaria	Suhindol, 94	Red	O
26	Hungary	St. Stephans Crown, Egri, 97	Red	O
27	Greece	Nemea, Lafkioti, 93	Red	O
28	Italy	Fontana Fredda	Sparkling White	O
29	Spain	Gran Baron	Sparkling White	O
30	Italy	Lambrusco, Dell'Emilia	Sparkling Rose	O
31	France	Paul Bur	Sparkling White	O
32	Argentina	Norton, Sangiovese, 95	Red	T
33	Chile	Carmen, 96	Red	T
34	Hungary	St. Stephans Crown, Szekszardi, 96	Red	T
35	Italy	Lambrusco	Sparkling Rose	F
36	California	Sutter Home, Fam. Res.	Red	F
37	Spain	Larums, Navarra, 97	White	F
38	Portugal	Charamba, 96	Red	F
39	France	Lirac, Rhone, 97	Red	F
40	Australia **	Sacred Hill, 97	Red	F
41	Bulgaria	Mavrud, Perushtitza, 93	Red	F
42	South Africa	Pinotage, 95	Red	F
43	Germany	Piesporter, Riesling, 97	White	F
44	Greece	Retsina, Boutari	White	F
45	Italy	Portapalo, Silicia	Red	F
46	Germany	Liebfraumilch, Phalz, 96	White	F
47	Spain	Torres, Coronas, 96	Red	F
51	Rumania	Galbena Odobesti, 95	Red	L
52	Rumania	Murfatlar Chardonnay 95	White	L

*) Imported and bottled by International Wine Cellars, Danmark

**) Imported and bottled by Chris Wine, Danmark

B Registration of Metal Packagings

Sample No.	Origin	Mark	Place of purchase
48	Denmark	Miller's Alkyd Lak Blank, Miller & Co, DK-2765 Smørum (DKK 50)	S
49	Holland	Tube hobby colour Holland Oil Colour, Amsterdam (DKK 36)	R
50	England	Tube hobby colour Winton 18 Oil Colour (DKK 36.)	R

C Places of Purchase
O Wine bottles bought at OBS, City 2, Taastrup
T Wine bottles bought at Taastrup Ny Vinhandel
F Wine bottles bought at Føtex, Taastrup
L Wine bottles provided in Aarhus
S Tin of alkyd lacquer bought at Sadolin, City 2, Taastrup
R Tubes with hobby colour bought at Regnbuen, City 2, Taastrup

Enclosure II

Enclosure relating to the Purchase